

**GUIDELINE B-7**  
**(formerly 15-08)**

**Incorporation of the Reasonable Use Concept into**  
**MOEE Groundwater Management Activities**

**Legislative Authority:**

*The Ontario Water Resources Act*

**Responsible Director:**

Director, Program Development Branch

**Last Revision Date:**

April, 1994

## **Table of Contents**

### **1.0 INTRODUCTION**

### **2.0 OBJECTIVES AND APPLICATION OF REASONABLE USE APPROACH**

#### 2.1 Definitions

### **3.0 THE ADMINISTRATIVE BASIS FOR THE REASONABLE USE APPROACH**

#### 3.1 Guidelines

#### 3.2 Determination of Reasonable Use

##### 3.2.1 The Present Use of Groundwater in the Vicinity

##### 3.2.2 The Potential Use of Groundwater in the Vicinity

##### 3.2.3 The Existing Quality and Quantity of the Groundwater in the Vicinity

#### 3.3 Potential for Domestic Consumption

#### 3.4 Other Land Uses

### **4.0 THE TECHNICAL BASIS FOR THE REASONABLE USE APPROACH**

#### 4.1 Good Groundwater Management Practices

#### 4.2 Safety Margins

#### 4.3 Hydrogeological Aspects

#### 4.4 Adjacent Land Use

### **5.0 ENVIRONMENTS UNSUITABLE FOR WASTE DISPOSAL**

#### 5.1 No appreciable attenuation can be provided

#### 5.2 Natural attenuation capacity is weak

#### 5.3 The subsurface is suited for better use

#### 5.4 The consequences of failure are unacceptable

### **6.0 DETERMINATION OF CONTAMINANT LIMITS AND ATTENUATION ZONES**

## **SYNOPSIS**

This guideline establishes the basis for determining the "reasonable use" of groundwater on property adjacent to sources of contaminants and for determining the levels of contaminant discharges considered acceptable by the Ministry.

The guideline is designed to facilitate implementation of the groundwater quality management directions contained in Procedure B-1-1: "Water Management -- Guidelines and Procedures of the Ministry of Environment and Energy," which are predicated on the protection of existing and potential reasonable uses of water. The reasonable use concept, in this context, applies only to groundwater quality management.

The technical details necessary for the application of the reasonable use approach shall be found in Procedure B-7-1: "Determination of Contaminant Limits and Attenuation Zones."

## **1.0 Introduction**

The Ministry is charged with the conservation of the groundwater resources of the Province and the control of the use of these resources in an effective manner for the public good. To this end, the Ministry may wish to discourage the use of some environments for waste disposal and encourage the use of other environments. The Ministry position is that disposal sites should be placed in environments where their impact will be limited, that acceptable disposal methods should be used and that these methods should be compatible with those particular environments.

## **2.0 Objectives and Application of Reasonable Use Approach**

This document explains the role of a "reasonable use" approach in the Ministry's activities related to the protection of groundwater quality. It establishes procedures for determining what constitutes the reasonable use of groundwater on property adjacent to sources of contaminants and establishes limits on the discharge of contaminants from facilities, approved by the Ministry, that are used for the disposal of waste into the shallow subsurface (referred to as "disposal sites" or "disposal facilities" in this document).

The impact a disposal facility may have on the reasonable use of neighbouring properties shall be limited to an amount that would not justify an award for damages in a civil law suit.

This guideline facilitates implementation of the Ministry procedures document B-1-1, "Water Management -- Goals, Policies, Objectives and Implementation Procedures of the Ministry of Environment and Energy," which are designed to protect existing and potential uses of water.

This guidelines applies to matters which fall under the authority of the *Environmental Protection Act* or the *Ontario Water Resources Act* (subject to appeal). In cases where the *Environmental Assessment Act* or the *Consolidated Hearings Act* is utilized, the decision-making power lies outside the Ministry, and the Ministry can only make recommendations.

The reasonable use concept applies only to groundwater quality management. Ministry surface water quality management guidelines are presented in procedures document B-1-1.

This guideline does not apply to the restoration of groundwater supplies that have been contaminated by "unregulated" sources, such as closed landfills or spills. These situations are addressed by Guideline B-9 (formerly 15-10): "The Resolution of Groundwater Quality Interference Problems."

## **2.1 Definitions**

The terms "disposal site," "contaminant attenuation zone," and "adjacent property" are defined in Procedure B-7-1: "Determination of Contaminant Levels and Attenuation Zones."

## **3.0 The Administrative Basis for the Reasonable Use Approach**

### **3.1 Guidelines**

The Ministry position, as presented in the procedures document B-1-1, requires sufficient levels of environmental control to protect reasonable uses of the groundwater for present and future users in the Province.

This guideline is intended to assist in making decisions about current and future activities of the Ministry. It is not intended that all disposal facilities be investigated immediately to determine if they meet the levels for contaminant discharge described in this document.

### **3.2 Determination of Reasonable Use**

The Ministry decision as to what constitutes reasonable uses of groundwater (either existing or potential) on land associated with, or adjacent to, disposal sites shall be made on a case-by-case basis. This is necessary because the wide variation in the quality, quantity and availability of groundwater makes a fixed approach impractical.

The responsibility for deciding what constitutes the reasonable use of the groundwater, as well as what uses should be protected, shall normally rest with the Regional Director. The Director's decision shall be made with input from a proponent and/or an assessment by staff. If this decision becomes a major issue, it may be made subject to a public hearing.

Reasonable current and potential uses shall be established, with respect to specific soil and water-bearing units in the subsurface, and would apply to all of the ground lying beneath a

particular property.

The decision as to the reasonable use of the groundwater at a particular location shall be based on three major considerations:

### **3.2.1 The present use of groundwater in the vicinity**

This is easily determined by a survey of the uses being made of the groundwater by nearby land owners and from data contained in Ministry files. In most instances, the current use shall be taken as the reasonable use.

### **3.2.2 The potential use of groundwater in the vicinity**

Where there is no current use being made of the groundwater, criteria shall be established on the basis of the potential reasonable use(s) of that water, based on the existing quality and quantity of groundwater and the current use(s) of groundwater in the general area. In addition, planning agencies and others may provide input in determining potential land use (which might affect the use of the groundwaters).

### **3.2.3 The existing quality and quantity of the groundwater in the vicinity**

The existing quality of the groundwater, and the amount that would be available to wells, shall be assessed by using data contained in Ministry files and a general knowledge of the hydrogeology in the area.

## **3.3 Potential for Domestic Consumption**

The potential use of groundwater in Ontario will almost always be for domestic consumption. This is because:

- (a) there are virtually no areas of Ontario where the quantity of groundwater that could be collected by a well would not meet the basic needs of a single family; and
- (b) although there are parts of Ontario where the quality of the groundwater does not meet the Ontario Drinking Water Objectives, in most cases, individual owners have used such waters on a continuing basis over many years.

The presence of piped or surface water supplies does not, necessarily, mean that the groundwater is unsuitable for domestic consumption. However, such supplies may be a contributing factor in a determination where other considerations, such as groundwaters of poor quality and/or limited quantity, would detract from the usefulness of the groundwater.

The desirable qualities of drinking water are specified in the document "Ontario Drinking Water Objectives." Water quality objectives for the protection of fish and aquatic life and

for agricultural use are stipulated in Tables 1 and 5 of the procedures document B-1-1. Each publication contains, in addition to the numerical objectives, directions as to their application.

It is also advisable to check with the Ministry for current Provincial Water Quality Objectives and Ontario Drinking Water Objectives.

In those instances where there is no Ministry objective for a given parameter, the Regional Director may specify what is considered to be an appropriate objective based on current scientific evidence.

### **3.4 Other Land Uses**

Related land uses which could be affected by contaminants transported by groundwater, and which are compatible with a reasonable use approach, include:

- (a) the use of the soil for agricultural activities;
- (b) the use of the sub-surface for facilities such as sewers, electrical conduits or building foundations; or
- (c) the use of the soil as fill.

## **4.0 The Technical Basis for the Reasonable Use Approach**

A number of general technical considerations have been taken into account in the development of this document.

### **4.1 Good Groundwater Management Practices**

The Ministry considers that the following positions shall represent good groundwater management practice:

- (a) By selecting a suitable location and employing appropriate technology, no substantial groundwater resource in Ontario need be degraded by a waste disposal site or facility. However, there are subsurface units that contain groundwater that is unlikely to be used for water supplies. This may be because the groundwater in these units has naturally poor quality (e.g. brine), or the yield is too low for practical use, or the groundwater has been contaminated (by, for example, urban development) and this contamination is expected to continue. A beneficial and reasonable use of such a unit may be to receive and naturally attenuate or treat contaminants that have been generated as a result of the disposal of waste.
- (b) Allocation of all of the attenuation capacity in a particular area to a single source of contaminants may not be prudent, because it may not be possible to prevent additional contaminant loadings in the future. Anticipated contaminant loadings shall be assessed, on

a case-by-case basis.

- (c) Provision shall be made for alleviating unacceptable environmental impacts, to the extent possible, should this prove to be necessary in the future. Unexpected events or failures shall be dealt with in a contingency plan. Those events that can reasonably be expected to occur shall be dealt with as part of the site design.

## **4.2 Safety Margins**

Using current technology, it is not generally possible to estimate accurately the quantity or the quality of contamination which will be discharged by a disposal facility. Uncertainty factors, on the order of at least five-fold, are common in the measurement of parameters such as hydraulic conductivity. Therefore, safety margins shall be considered in all estimates of contaminant discharge.

The appropriate safety margin would have to be calculated on a case-by-case basis and depend on the complexity of the hydrogeological environment, the characteristics of the waste treated and the contaminants produced, the value of the resource, and the consequences of failure.

A higher level of certainty is possible when an existing contaminant plume is present and can be used in an assessment.

## **4.3 Hydrogeological Aspects**

There are some practical differences in the hydrogeological aspects of facilities used for the disposal of solid waste and those used for liquid waste. These differences, which can be considered in applying this guideline, are:

- (a) As a contaminant plume will generally develop more rapidly from liquid than solid wastes, the monitoring data needed to measure the performance of a liquid waste disposal facility may be collected relatively quickly. The technical, administrative and financial concerns associated with long-term monitoring of a solid waste disposal facility are greater.
- (b) Contingency measures for a liquid waste disposal facility include shutting off the waste discharge and providing pre-treatment for the effluent. Such relatively simple contingency measures are probably impractical for a solid waste disposal facility.

## **4.4 Adjacent Land Use**

The use of land adjacent to a disposal facility, in addition to those uses associated with water supplies, can be affected by liquid or gaseous contaminants transported by the groundwater or moving through the unsaturated zone in the subsurface. The protection of these uses is also the responsibility of the Ministry. This is addressed in Guideline D-4 (formerly 07-07) "Land Use On or Near Landfills and Dumps."

## **5.0 Environments Unsuitable for Waste Disposal**

The Ministry may not support proposals for facilities for the disposal of waste in the following environments:

### **5.1 No appreciable attenuation can be provided**

A disposal facility may not be supported in a location where no appreciable attenuation can be provided in the subsurface and an excessive amount of the attenuation required for acceptable discharge must be provided by dilution in surface waters. The impact on surface water by contaminants carried from a disposal site by the groundwater will almost always be undetectable. However, unacceptable circumstances might exist where the subsurface travel time for contaminants is very short and the time for the degradation of the easily biodegradable organic contaminants is inadequate to substantially reduce their concentrations.

### **5.2 Natural attenuation capacity is weak**

A disposal facility may not be supported in a location where the ability of the natural environment to attenuate contaminants is weak, as in fractured rocks, and as compensation, a very large area is required for the attenuation of contaminants. For technical reasons, environments where this is necessary are generally quite expensive to evaluate and contingency plans in such environments are seldom practical.

### **5.3 The subsurface is suited for better use**

A disposal facility may not be supported in a location where the subsurface beneath the facility is particularly suited for a better use. For example, waste disposal may not be supported in an esker of sand and gravel where the esker might be needed at some future date for the development of a water supply.

### **5.4 The consequences of failure are unacceptable**

A disposal facility may not be supported in a location where the consequences of failure are unacceptable. For example, waste disposal may not be supported where failure and a resulting contaminant discharge might affect the sole source of a community water supply to an unacceptable degree.

## **6.0 Determination of Contaminant Limits and Attenuation Zones**

The technical details necessary for the application of the reasonable use approach to proposed disposal sites, operating disposal sites, and disposal sites requesting approval for expansion shall be found in Procedure B-7-1 "Determination of Contaminant Limits and Attenuation Zones." In this document, guidance is provided for:

- (a) determining quantitatively the acceptable levels of various contaminants originating in



- (b) disposal sites and impinging on adjacent properties; and  
assessing the suitability of a contaminant attenuation zone, and the limits of a disposal site.